Amendments to the Specification:

Please amend paragraphs [035]--[037], [040], and [048]-[052], as shown below.

[035] FIG. 2A illustrates an exemplary construction of the interleaver 107 in the encoder 100 consistent with features and principles of the present invention. The interleaver 107 includes a first blocker 201, an intra-permuter 202, a second blocker 203, and an inter-permuter 204. The interleaver 107 permutes the order of symbols in the source sequence of symbols X 101 into a sequence of interleaved symbols 108. In its operation, the interleaver 107 produces a sequence of blocks 205, a sequence of intra-permuted symbols 206, and a sequence of intra-permuted blocks 207. The source sequence of symbols X 101 is partitioned ~~grouped~~ into the sequence of blocks 205 by the first blocker 201. The intra-permuter 202 re-orders the symbols within each block of the sequence of blocks 205 to form the sequence of intra-permuted symbols 206. The sequence of intra-permuted symbols 206 is partitioned ~~grouped~~ into the sequence of blocks 207 by the second blocker 203. The inter-permuter 204 re-orders the symbols across the blocks in the sequence of intra-permuted blocks 207 to form the interleaved output sequence of symbols 108.

[0036] FIG. 2B illustrates results at different temporal stages in the exemplary interleaver 107 consistent with features and principles of the present invention. The symbols in the source sequence of symbols X 101 are labeled with numeric indices 211 starting from number one. The source sequence of symbols X 101 is partitioned ~~are grouped~~ by the first blocker 201 into the sequences ~~sequence~~ of blocks 205. The blocks in the source sequence of blocks 205 are represented as shaded symbols with indices 211, wherein symbols having the

same shade are in the same block. All the blocks in the sequence 205 are of an equal length L 209 in symbols. For example, a first block 212 in the sequence of blocks 205 contains the symbols in the source sequence X 101 with indices 211, in order, from one to L. A second block 213 in the sequence of blocks 205 contains the symbols in the source sequence X 101 with indices 211, in order, from L+1 to 2L. Subsequent blocks in the sequence of blocks 205 contain L symbols in the source sequence X 101, wherein the ~~an~~ I^{th} block in the sequence of blocks 205 contains the symbols in the source sequence 205 with indices 211, in order, from ((I-1)*L)+1 to I*L. More particularly, if L is equal to ten, then the first block 212 in the sequence of blocks 205 contains the symbols in the source sequence X 101 with indices 211, in order, from one to ten. The second block 213 in the sequence of blocks 205 contains the symbols with indices 211, in order, from eleven to twenty. The I^{th} block in the sequence of blocks 205 contains ten symbols in the source sequence X 101 with indices 211, in order, from ((I-1)*10)+1 to I*10.

[0037] The symbols within each block of the sequence of blocks 205 are re-ordered by the intra-permuter 202 to form the sequence of intra-permuted symbols 206. The sequence of intra-permuted symbols 206 is grouped into the sequence of intra-permuted blocks 207 by the second blocker 203. The intra-permuted blocks in the sequence of intra-permuted blocks 207 may or may not have the same length in symbols as the blocks in the sequence of blocks 205, but for illustration, it is assumed that the lengths are equal, namely of length L 209. The first intra-permuted block 214 in the sequence of intra-permuted blocks 207 contains the symbols from the source sequence X 101 with indices 211, in a following order, two, five, one, six, and so forth to the L^{th} symbol in the first intra-permuted block 214. The second intra-permuted block 215 in the

sequence of intra-permuted blocks 207 contains symbols from the source sequence X 101 with indices 211, in a following order, L+2, L+5, L+1, L+6, and so forth to the L^{th} symbol in the second intra-permuted block 215. Subsequent intra-permuted blocks in the sequence of intra-permuted blocks 207 contain L symbols from the source sequence X 101, wherein the ~~an~~ J^{th} intra-permuted block in the sequence of intra-permuted blocks 207 contains symbols from the source sequence X 101 with indices 211, in a following order, ((J-1)*L)+2, ((J-1)*L)+5, ((J-1)*L)+1, ((J-1)*L)+6, and so forth to the L^{th} symbol in the J^{th} intra-permuted block.

[0040] FIG. 2C further illustrates results at different temporal stages of the exemplary interleaver consistent with features and principles of the present invention. In the example illustrated in FIG. 2C, the duration 208 of the source sequence of symbols X 101 is of finite length and consists of twenty-four symbols, the length L 209 of each block in the sequence of blocks 205 and the sequence of intra-permuted blocks 207 is six, and the number of blocks B 210 to inter-permute across is three. The symbols in the source sequence of symbols X 101 are labeled with indices 211 from one to twenty-four. The source sequence of symbols X 101 is partitioned ~~grouped~~ into the sequence of blocks 205 with four blocks 220 of six symbols each. The blocks in the sequence of blocks 205 are represented as shaded symbols with indices 211, wherein symbols having the same shading are in the same block. The symbols within the sequence of blocks 205 are intra-permuted within each block to produce the sequence of intra-permuted symbols 206. The intra-permutation re-orders the symbols within each block in the manner indicated by arrows 221. For example, the symbols in the first block of the sequence of blocks 205 with indices one, two, three, four, five, and six are re-ordered to two, five, one, six,

three, and four in the first six intra-permuted symbols 222 of the sequence of intra-permuted symbols 206. The intra-permuted symbols in the sequence 206 are grouped into the sequence of intra-permuted blocks 207 with four intra-permuted blocks 223 of six symbols each. The intra-permuted blocks in the sequence of intra-permuted blocks 207 are represented as shaded symbols with indices 211, wherein symbols having the same shading are in the same intra-permuted block. The sequence of intra-permuted blocks 207 are inter-permuted to the sequence of interleaved symbols 108 by re-ordering symbols across the blocks 223 in the sequence of intra-permuted blocks 207 in the manner indicated by arrows 224.

[0048] By way of example, another embodiment of the invention involves an interleaver construction 700 with three processes as illustrated in Figure 7. An entire input sequence of symbols 702 is segmented into M blocks ~~sub-blocks~~ of symbols in a first process 704. Lengths of the blocks ~~sub-blocks~~ may be the same or different. For this example, each block ~~sub-block~~ is assumed to be the same length of R(2D+1) symbols, where R is a positive integer and D is predefined positive integer. The blocks ~~sub-blocks~~ are sequentially enumerated from 1 to M blocks ~~sub-blocks~~. A K^{th} block ~~sub-block~~ is one of the M blocks ~~sub-blocks~~, where K is between 1 and M, inclusive.

[0049] Second and third processes 706 & 708 perform intra-block and inter-block permutations on the blocks ~~sub-blocks~~, respectively. The intra-block permutation 706 may be based on any known method, such as s-random or prime interleavers as known by persons of ordinary skill in the art. The inter-block permutation process 708 swaps symbols in a block ~~sub-block~~ with those of N_h neighboring blocks ~~sub-blocks~~, where N_h is less than or equal to 2D

blocks ~~sub-blocks~~ and 2D is the permutation spread of the inter-block permutation in blocks ~~sub-blocks~~.

[0050] After the third process 708, a sequence of interleaved symbols is formed at step 710, in which the symbols in a K^{th} block ~~sub-block~~ are spread over E_K blocks ~~sub-blocks~~ prior to the K^{th} block ~~sub-block~~ and L_K blocks ~~sub-blocks~~ after the K^{th} block ~~sub-block~~. E_K is the lesser of D and (K-1), which is denoted as min(D, K-1). L_K is the lesser of D and (M-K), which is denoted as min(D, M-K).

[0051] Consistent with features and principles of the present invention, an overall interleaving algorithm may be illustrated by a flowchart 800 in Figure 8. At a start of the algorithm, K is set to one at step 802. From step 802, if K is not less than (M+1) at step 804, then the algorithm stops at step 806. If K is less than (M+1), then intra-block permutation is ~~are~~ performed on the K^{th} block ~~sub-block~~ at step 808. E_K and Q are set to min(D, K-1) and zero at steps 810 and 812, respectively. From step 812, if Q is not less than R(2D+1) at step 814, then K is incremented at step 816 and the algorithm returns to step 804. If Q is less than R(2D+1), then the algorithm returns to step 818. At step 818, if (K-Q-1) modulo (2D+1), denoted as mod(K-Q-1, 2D+1), is not less than E_K, then Q is incremented at step 820 and the algorithm returns to step 814. If mod((K-Q-1), (2D+1)) is less than E_K, then the Q^{th} symbol in the K^{th} intra-permuted block ~~sub-block~~, denoted as [K; Q], is swapped with the $(Q\text{-mod}(Q, 2D+1)+\text{mod}(K-1, 2D+1))^{th}$ symbol in the $(K\text{-mod}(K-Q-1, 2D+1))^{th}$ intra-permuted block ~~sub-block~~, denoted as [Q-mod(Q, 2D+1)+mod(K-1, 2D+1); K-mod(K-Q-1, 2D+1)], at step 822. After swapping at step 822, the algorithm increments Q at step 820 and returns to step 814.

[0052] Both the intra-block and inter-block permutations in Figure 7 may be deterministic. Thus, once rules for both permutations are determined, the intra-block and inter-block permutations may be combined into a single step. In another embodiment, a resulting interleaving algorithm combining the permutations into a single step is illustrated as flowchart 900 in Figure 9. At a start of the algorithm, K is set to one at step 902. From step 902, if K is not less than (M+1) at step 904, then the algorithm stops at step 906. If K is less than (M+1), then E_K and Q are set to min(D, K-1) and zero at steps 908 and 910, respectively. Following step 910, if Q is less than R(2D+1) at step 912, then the algorithm progresses to step 914. At step 914, Q' is the intra-block permuted position of Q. If mod(K-Q'-1, 2D+1) is not less than E_K, then the symbol at [mod(K, D+2); Q] is moved to [mod(k, D+2); Q'] at step 916, Q is incremented at step 918, and the algorithm returns to step 912. If mod(K-Q'-1, 2D+1) is less than E_K at step 914, then the symbol at [mod(K-mod(K-Q'-1, 2D+1), D+2); Q'-mod(Q', 2D+1)+mod(K-1, 2D+1)] is moved to [mod(K, D+2); Q'] at step 920, the symbol at [mod(K, D+2); Q] is moved to [mod(K-mod(K-Q'-1, 2D+1), D+2); Q'-mod(Q', 2D+1)+mod(K-1, 2D+1)] at step 922, and the algorithm returns to step 918. At step 912, if Q not is less than R(2D+1), then the algorithm progresses to step 924. At step 924, if K is less than (L_1+1), then a mod(K-D-1, D+2)th block ~~sub-block~~ of interleaved symbols is outputted at step 926 and the algorithm progresses to step 928. If K is not less than (L_1+1), then the algorithm progresses directly to step 928. At step 928, if K is equal to M, then remaining mod(K-D+P, D+2)th blocks ~~sub-blocks~~ of interleaved symbols for P = 1, 2, ..., D are outputted at step 930 and the algorithm progresses to step 932. If K is not

equal to M, then the algorithm progresses directly to step 932. At step 932, K is incremented and the algorithm progresses to step 904.